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## **1 Latin American Trade and Transportation Study (1997)**

This study was performed by Wilbur Smith and Associates for a group of state DOT's comprised of the southeast states including Texas. Results are somewhat relevant because of the Texas presence and the separation by origin Latin American country which shows Mexico flows by weight and value for 1996. However, the inclusion of Florida and Texas together in most findings makes these results difficult to apply to the current study.

## **2 Arizona Port Efficiency Study (1997)**

This study was commissioned to “develop, demonstrate, and evaluate new or revised operating procedures and systems for enhancing the efficiency of cross-border flows...” and covers both freight and passenger flows for the Nogales ports of entry, both Grand Avenue and Mariposa (Passenger and Cargo). The study includes an extensive explanation of (then) current port procedures and physical conditions, as well as charting vehicle flows by type for the period October 1995 to November 1996.

In some sense this study parallels the current work. A simulation model of the port of entry was constructed, and specific metrics were considered, including average time waiting to enter the port and average time within the port. This study also looks at hour by hour congestion since there is wide variability in arrival time and the report notes the possibility of gridlock once large numbers of vehicles accumulate in the port of entry. There is extensive reporting of simulation results for four scenarios including port expansion east and north, better x-ray devices, and streamlined procedures, as well as a combined consensus scenario.

The report lays out possible “needs and opportunities” in four areas – Management Structure, Operations/Procedures, Enabling Technologies, and Infrastructure. Although it would be interesting to see which, if any of the various initiatives have been explored and implemented, that was not in the scope of this project. It should be noted that this study preceded the implementation of Super booths in the port of entry.

### 3 Impacts of Transportation and Education Policy on Trade and Development in the Arizona-Sonora Region (1998)

Details trade flows between Arizona and Sonora in the early to mid 1990's, including breakdowns by mode, origin, and destination. Documents the importance of automotive rail traffic destined to Michigan, while noting much of the truck traffic has either an origin or destination in one of the two states. Table of contents shown below, but data is out of date.

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#### **4 Arizona Trade Corridor Study (1999)**

This study investigated the costs and benefits of various proposed improvements to the infrastructure and processes supporting Arizona's East-West and North-South trade routes. Particular attention was paid to CANAMEX corridor improvements, especially to SR 93, I-19, I-17 and other highway improvements. Many of the improvements considered have since been implemented.

General patterns of trade flows with Mexico do not appear to have changed significantly since this study. The study documented a number of the same complaints which were found in the current (2005) study, including lack of coordination between US and Mexican authorities and some lack of coordination among US agencies. The study also indicated that congestion at the border and poor Mexican infrastructure were problems at that time. The study made specific projections by port for traffic levels up through the year 2000. Finally, this study contains a specific recommendation on Guaymas:

“The Governor of Arizona should support funding, through either federal or state sources, for a study that assesses the viability of the port of Guaymas, Mexico as a deep water seaport that is part of the CANAMEX trade corridor. This study should include the potential increase in international freight and the potential flows of additional freight and rail traffic through Arizona ports-of-entry.”

## **5 Arizona Rail Plan (2000)**

This is the review of rail operations in Arizona that is done every five years. Based on discussions with Arizona Department of Transportation (ADOT), it is out of date and will be updated in the near future. Nevertheless, a few key points:

The Union Pacific (UP) railroad, in particular, has some infrastructure that is at full capacity and causes delays. This includes the Picacho-Tucson line as well as considerable sections of the east-west line through Arizona that is not double-tracked.

Although there are currently 3 trains per day in each direction along the Nogales/Guaymas corridor, the vast majority of rail traffic moving through Arizona is east-west and neither originates at nor is destined to Arizona locations.

As of this report (2000), Burlington Northern Santa-Fe (BNSF) was running slightly more trains in Arizona than UP, although that has likely changed in the interim.

## **6 U. S.-Mexico Border: Better Planning, Coordination Needed to Handle Growing Commercial Traffic (2000)**

This study was performed by the General Accounting Office to understand the levels of congestion at the US-Mexico border and possible solutions. Initial conclusions are quoted below:

Commercial traffic congestion at the US-Mexico border is primarily caused by the high volume of vehicles at ports of entry that must be processed through facilities that have physical and technological limitations and cumbersome practices. The specific factors that contribute to border congestion include (1) difficulties resulting from the multiple checks at the border by various federal and state agencies; (2) inspection agency staffing shortages at some border crossings; (3) limited use of automated management information systems for processing commercial traffic; (4) lack of land to expand port of entry operations; (5) inadequate roads leading to some ports of entry; and (6) poor port of entry planning among US inspection agencies and limited coordination between the US and Mexican governments.

The report includes descriptions of the various ports along the US-Mexico border including processes, facilities, and flows. Nogales is specifically discussed (pages 12-13) as well as general discussions of roles for Federal agencies at border crossings. Results are heavily based on interviews with users, agency personnel, and other stakeholders, while flow data was gathered from secondary sources, also.

## **7 Intelligent Transportation Systems at International Borders ( 2001)**

Description of a test of new information systems and other technology, as well as procedural changes, performed at Nogales in 1998/1999. Improvements in throughput and waiting time are documented. Similar reports are included for other ports of entry along the US border.

## **8 The CANAMEX Corridor Coalition (2001)**

The CANAMEX Corridor Coalition was established by the governors of Arizona, Nevada, Utah, Idaho and Montana. Recognizing the shared challenges and opportunities presented by the region's principle North/South transportation corridor, the governors of these five Western states signed a memorandum of understanding to prepare a corridor plan. The CANAMEX Corridor Plan was designed to guide strategic transportation and other infrastructure investment. The Plan is divided into three tasks; next we summarized the Task I and task III.

### **The Task I Working Paper: Existing Infrastructure**

The report lays the foundation for identifying critical infrastructure deficiencies along the Corridor and for using public policy and investment decisions to enhance regional economic development. The infrastructure reviewed in this report includes transportation and telecommunications facilities and networks essential for the continuance and future growth of Corridor communities. Drivers of economic development such as industry clusters, universities, training centers, research facilities and other institutions, as well as local development tools and programs, are also considered as part of the Corridor's underlying infrastructure. This task is divided into the following three sections:

#### **Economic Conditions and Programs:**

This section details current and historic economic conditions in Corridor states and communities. This section presents an overview of each state's economy, by industry sector, with an emphasis on specific conditions in the metropolitan areas directly along the Corridor highway. Economic development programs and districts are considered within each state and Corridor region.

#### **Transportation Infrastructure:**

This section presents an inventory of transportation facilities in the Corridor including highways, airports, railroads, ports, and customs operations. This section considers existing and projected utilization at key points of the highway system, along with current levels of service.

#### **Telecommunications Infrastructure:**

This section presents an analysis of existing wireline and wireless communication and data transmission facilities and services. Also, it identifies points of weakness in the existing networks along the Corridor, such as "deadspots" in cellular service and areas with limited access to broadband data transmission capability.

### **The Task III Working Paper - Transportation Strategies and Economic Impact Analysis**

This working paper identifies five Initiatives for the Corridor, discusses transportation conditions along Corridor. Also, it identifies transportation and Intelligent Transportation Systems (ITS) strategies for the CANAMEX Corridor, and assesses the economic impact of each of the Initiatives.

#### **Executive Summary:**

This section provides a brief summary of the five Initiatives, transportation demands and issues, transportation and ITS strategies, and the results of the economic impact analysis by geographic area and by Initiative.

#### **Description of Initiatives:**

This section presents a description, along with background information, for each of the five Initiatives.

#### **Transportation Demands and Issues:**

This section analyzes existing conditions and identifies key transportation issues for the CANAMEX Corridor.

#### **Transportation Investment Strategies:**

This section presents transportation and ITS strategies for the CANAMEX Corridor, quantifies the investment level required for each strategy, and assesses the efficiencies gained as a result of each strategy.

#### **Economic Impact of Initiatives:**

This section presents the results of an economic impact analysis of the five Initiatives. The economic impact of each initiative for each state and for the five-state region is included.

## 9 Arizona's Border Issues (2002)

A discussion of education, health, environment, and infrastructure issues in the Arizona border counties – Cochise, Santa Cruz, and Yuma. There is considerable detail on the work force and other conditions which are related to these areas lagging behind the state as a whole. For purposes of this project, the section on border trade plots the declines in Nogales' share of Mexican trade over the 1994-2001 period, and there is a discussion of international airports located in Yuma, Nogales, and Bisbee-Douglas.

### Contents:

- Definitions: Arizona's Border Region, Border Counties and Communities, Border Zone
- Border Economy
- Impact of Border Trade
- Border Issues
- Education
- Health
- Environment
- Infrastructure

### Key Exhibits/Figures:

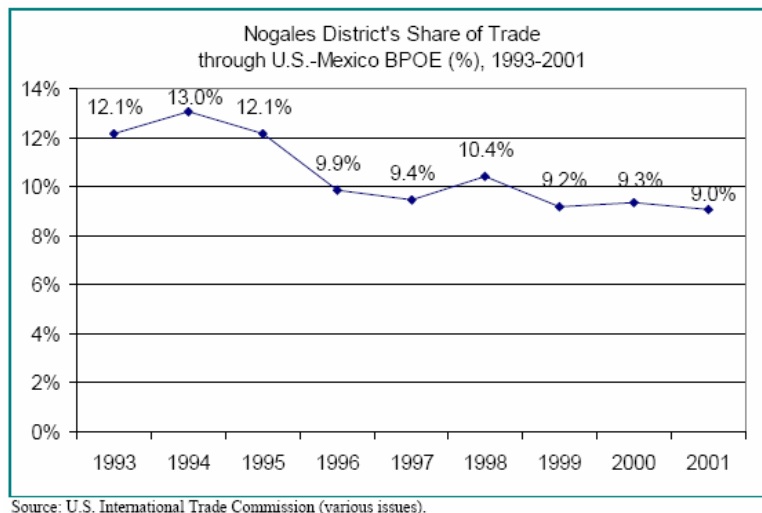


Figure.3 Nogales District's Share of Trade through US-Mexico BPOE (%), 1993-2001.

SELECTED STATISTICS FOR INTERNATIONAL AIRPORTS IN THE ARIZONA BORDER REGION			
	Yuma	Nogales	Bisbee-Douglas
Elevation	213 ft	3,932 ft	4,151 ft
Use	Public/commercial/ Military	Public/commercial/ military	Public
Aircrafts based	194	28	31
Aircraft operations	Avg 474/day	Avg 80/day	Avg 88/day
Runway	3L/21R 13,300 ft by 200 ft	03/21 7,199 ft by 90 ft	08/26 7,002 ft by 75 ft
Surface	Concrete (good)	Asphalt (good)	Asphalt (poor)
Runway	3R/21L 9,241 ft by 150 ft	Helipad 97 ft by 97 ft	17/35 7,311 ft by 150 ft
Surface	Asphalt, concrete (good)	Concrete	Asphalt (good)
Runway	08/26 6,146 ft by 150 ft		
Surface	Asphalt, concrete (good)		
Runway	17/35 5,711 ft by 150 ft		
Surface	Asphalt, concrete (good)		

Source: Barnard Dunkelbert & Company, "Arizona Airport Land Use Compatibility Study," *Arizona Aviation System Plan* and AirNav.com; found on Internet at <http://www.airnav.com/airports/us/AZ>.

Figure.7 Selected Statistics for International Airports in the Arizona Border Region.

## **10 Nogales International Airport Master Plan (2002)**

This study documents current and possible future capabilities for the Nogales airport. Section 3.3.2, Socioeconomic Trends, includes some economic data on employment and discussion of the general environment for growth of US-Mexico trade. The study also includes detailed descriptions of the (then) current facilities available at the airport and proposes possible expansion scenarios.

## **11 Nogales CyberPort Project: Comprehensive Report (2003)**

Nogales' share of border trade with Mexico has declined over the last 10-15 years in spite of innovation by US and Arizona port authorities. This study was conducted to explore options for further improving the efficiency and throughput of the Nogales port, especially through changes in processes and increased use of technology. Four separate studies were conducted:

### **Commodity Flow Study:**

Attempted to determine how much traffic was flowing between Arizona and Mexico and what potential there might be to increase that traffic. Thus, the study considered what might be Arizona's natural "tradedshed," i.e. regions of the US and Mexico where Arizona is the logical originator, destination, and/or through path for the trade. It appears that Arizona has potential to be the corridor between the Western US and Western Mexico in some cases, as well as between the Western US and South Mexico. The study found that, by weight, the current top import commodities were fresh vegetables and concrete products, while the top exports were field crops and metallic ores.

### **Logistics Study:**

Dealt primarily with describing and flow charting the movement of goods through the Nogales ports of entry. There is a detailed process map of the path for northbound traffic, as well as various statistics and descriptions relevant to the Mariposa port of entry.

### **Legal Study:**

This study summarized the legislative and regulatory decisions that pertain to trade between the US and Mexico. In addition, both US and Mexican customs procedures are discussed and explained. Finally, Article 512, Section 2 of NAFTA, which covers eventual harmonization of customs processes, is quoted through subsection 7.

### **Concept Study:**

It puts forth the Cyberport idea including several alternative approaches to improving the port of entry performance through changing port structure and organization, potentially, on both sides of the border.

The following two pages show the List of Figures and List of Tables from the Cyberport Commodity Flow Study.

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## **12 Arizona's Global Gateway (2003)**

A discussion of the current state and possible prospects of each of Arizona's three ports of entry. Points out that the real driver of Arizona's trade with Mexico is the linkage with the agricultural production of western Mexico, since no other state has such a direct connection.

This paper briefly mentions the obstacles to Guaymas becoming a major port, including a shallow draft for the harbor and lack of demand for outbound services. Paper contains three "Annexes", one for each port. These specifically describe the operations of the port, the most desirable improvements, and possible funding sources to make these improvements.

### **13 The National I-10 Freight Corridor Study (2003)**

The I-10 Corridor carries much of the import traffic from Asia which enters at the ports of Long Beach and Los Angeles. Since some of this traffic could potentially relocate to Guaymas, this report has some relevance. In addition, any effort to move traffic from Guaymas to the eastern part of the United States would involve some use of I-10.

The report does not deal specifically with imports from or exports to Mexico, but does suggest that congestion and slow highway speeds are likely to get worse over the next fifteen years in the I-10 corridor. The report projects the effects on Level of Service (LOS) in the corridor from a number of mitigation strategies.

## 14 Transportation/Logistics Research Project: Trade Flow Study (2004)

This report delineates freight flows by mode into, out of, and through Arizona based primarily on 2001 data from a recognized source (Reebie and Associates), supplemented by ADOT traffic counts and some validation through US Department of Agriculture data. Data is typically presented in both weight and dollars, and includes some detail by commodity as well as by Individual County in Arizona.

For purposes of this project, the most relevant findings are in Chapter 7, International Flows. Virtually all of Arizona's international traffic is to or from Mexico, and 43% is simply "through" traffic which neither originates nor terminates in state. (Note this does not include east-west traffic, since that is considered "domestic" even if it originates at a California port). Nearly 80% of traffic to and from Mexico is by truck, and the majority of traffic that is not "through" involves Maricopa County. Approximately 60% of the traffic coming into Arizona is either farm or food products, which contributes to the seasonal congestion that has been documented at Nogales.

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## **15 Move Arizona (2004)**

This document sets out the current transportation situation in Arizona as well as a framework for strategic planning for the Arizona Department of Transportation over the next 5-10 years. Of particular relevance to this study is Appendix G, which discusses goods movement in Arizona, and particularly section 3, which deals with international movements.

The report has excellent descriptions and maps of the current Arizona network and utilizes the Freight Analysis Framework from the U. S. Department of Transportation to estimate the weight and value of various commodities moving between Arizona and various other countries, in particular Mexico.

## **16 Guaymas Master Development Plan (2005)**

A PowerPoint presentation made by port officials from *Secretaria de Comunicaciones y Transportes* (SCT) that looks at the potential for Guaymas to add value for users and to compete with the Los Angeles/Long Beach port complex for container traffic from Asia. The presentation includes a Strengths, Weakness, Opportunities and Threats (SWOT) analysis of the port, assuming container handling equipment is installed and 4000 TEU vessels can be accommodated. The presentation also includes forecasts for both imports and exports to the Southwest and Midwest regions of the US. Among other interesting findings, the presentation indicates an approximate one day time penalty for using Guaymas vs. the West Coast, and approximately equal cost from Asia.

## **17 Mariposa US Port of Entry Feasibility Study (2005)**

This study was undertaken by a consulting team under the management of ADOT and General Services Administration (GSA). Its purpose was to evaluate the feasibility, including the “requirements, costs and benefits” of expanding the Mariposa Port of Entry in Nogales.

As part of this task, the team documented historical vehicle flows from Mexico into the U. S. through the port. Both annual counts and monthly numbers were compiled from 1996 through 2004, as well as average day of the week counts. The report notes that both Laredo and Calexico increased their share of border traffic after those ports were improved. Also, it suggests that Nogales may be able to reclaim some of the Calexico traffic in particular if the Nogales port is improved. The report also documents the current port layout infrastructure, and access roads in detail.

One of the appendices of the first volume is a “Nogales Economic Study” which discusses many of the economic development initiatives which could affect the port, especially Mexican developments in the state of Sonora. The report points out the private development taking place in San Luis and Douglas, and claims that “western-bound trucks (currently 50 percent of Nogales freight traffic) will undoubtedly cross at San Luis” after improvements are made there. On the other hand, the possible development of Puerto Nuevo in Tucson is seen as a major positive development.

Mexican shipments of produce to the US continue to be dominated by Nogales, which has 48% of the Mexican import market, and 30-35% of the entire produce import market during peak season. In fact, approximately 42% of all vehicles entering at Nogales carry produce, and the distributor community is very strong. According to the Fresh Produce Association, the average time from field to crossing and reload to a US truck is 12 to 48 hours. Total delivery time is 4 to 7 days. Peak season is September/October through April/May.

The report details the planned Ford expansion as known in May, 2005 as well as key tenants of the supplier park for the expanded Hermosillo plant. Finished cars from Hermosillo will probably go north by rail, while as many as 300 trucks per day southbound are projected.

The consultants also interviewed Sonora government officials who suggested that if Guaymas can function as a significant reliever port for the US West Coast; this would also generate new traffic through Nogales. The Sonora government intends to pursue both tourism and import/export growth in connection with the port and to tap into Arizona's sizable linkages with Sonora and with Asia. The Guaymas harbor is currently 39 feet deep but could be dredged to the 42 foot draft required for somewhat larger ships.

## 18 Nogales Railroad Assessment Study (2005)

This study outlines the volumes and accompanying traffic issues that arise from the significant amount of rail traffic through Nogales, Arizona (two 100 car trains per day in each direction). The study contains northbound rail crossing information from 1994-2004 as well as a map of the railroad's routes and a listing of at-grade railroad crossings, controls for those crossings, and accident data by crossing for 2001-2004. The study also lists the following possible improvements to the current rail infrastructure in the Nogales area:

- **Grade separations** for better vehicular access (less interference with Nogales car and truck movement).
- **Improved traffic control devices** to improve vehicle safety at crossings.
- **Pedestrian overpasses** to improve pedestrian safety.
- **Expansion of emergency services** to compensate for rail-caused delays.
- **Notification procedures for municipal agencies** to improve emergency response.

### Relevant Figures and Exhibits:

- Rail activity at Deconcini Port of Entry.
- Rail operations in the city of Nogales.
- Rail freight processing procedures.
- Overpass construction.
- Rail issues and mitigation measures.
- Key Exhibits – Northbound Train Crossings (1994-2004), Average Containers per Train (1994-2004), 2004 Commodities (Value) through Nogales by Rail.

## **19 Container Port Capacity Survey (2005)**

This study reports the results of a survey of 24 of the 32 largest North American container seaports. The study shows separate results for Western ports, and diversion from these ports is one potential source for container traffic at Guaymas.

According to the report, the Western ports have the highest risk of congestion over the next 10 years. The Western port directors view their worst impediments to be environmental regulations, local highway access, local community concerns, and national rail capacity.

Given this set of concerns, it seems unlikely that major port expansion will take place at the California ports. However, process improvements and better labor utilization may be implemented to increase throughput.

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